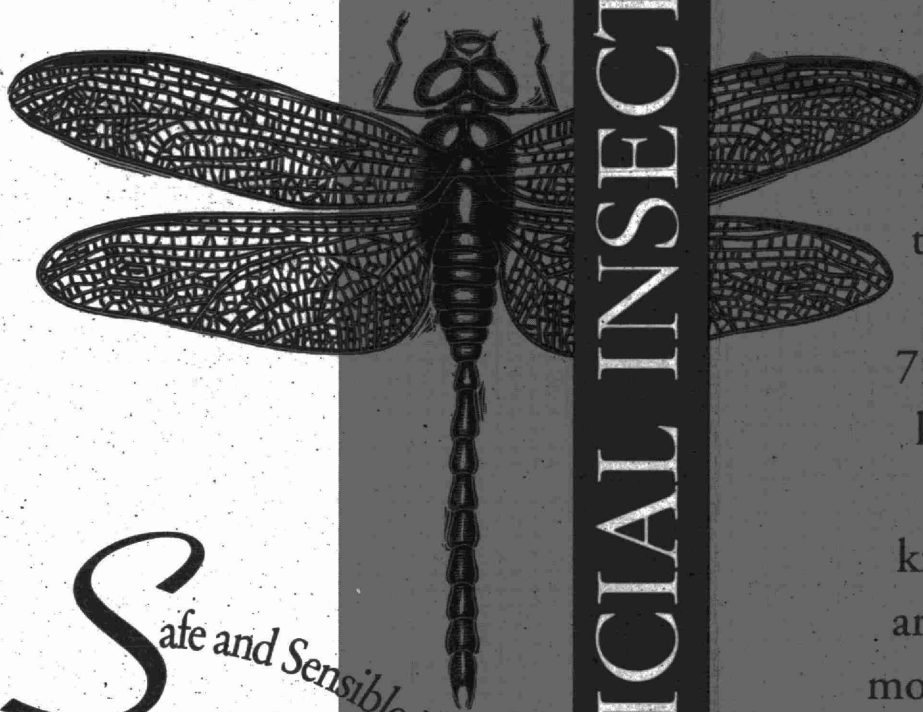


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BENEFICIAL INSECTS

Safe and Sensible Pest Control
One in a series
of environmentally
aware solutions to
home and garden
pest problems



Insects are a vast group of creatures: there are more species of beetles alone than there are of all other animals put together. Although over 750,000 species of insects are known, thousands are yet to be described and no one knows how many there really are. What we do know is that most species are not pests. The status of pest is reserved for the few dozen species that really bother us by eating our food crops, infesting our homes, biting our pets or by buzzing around our ears.

If they are not pests, what are all the other insects doing? Some species are pollinators, others decompose waste material or serve as food for birds and fish, while still others are predators that feed on pests. These beneficial insects (and mites) are a vastly underestimated resource, important to backyard gardeners as well as farmers. The natural enemies of pests, in particular, are a fascinating and valuable group of native animals.

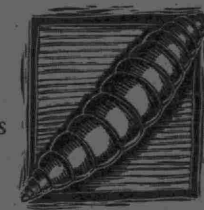
Predators versus Parasites

Insects that attack other insects fit into two main groups: predators and parasites. The predators are like lions and tigers of the insect world. They need to eat many other insects to complete their life cycle. A ladybird beetle, for example, may eat over 2400 aphids during her lifespan. The parasites (also called parasitoids) develop from an egg laid in, or on, another insect. In contrast to predators, parasites complete their development to adulthood by killing only one host. Sometimes many parasites develop simultaneously from a single pest egg or caterpillar. Within these two broad groups there are many different life cycle variations. In some species, both adults and immature stages (called larvae) are predators on insects. In others, only the larvae feed on insects while the adults live on pollen and nectar. Some natural enemies have tastes restricted to one particular host species, while others eat any insect they catch. Natural enemies occupy a great variety of habitats, from burrows in the soil to the tops of the

Beneficial insects are a vastly underestimated resource, important to gardeners as well as farmers

highest trees. Following is a sample of the variety of common natural enemies anyone can find in their yard.

FLIES Although buzzing house flies spring to mind when we think of flies, there are actually many different families of beneficial flies. They range from the delicate, long-legged **aphid midges** whose tiny, bright orange larvae are aphid predators, to large bristly, grey **tachinid flies** (tack-eye'-nid) that are important parasites of tent caterpillars and other pests. **Syrphid flies** (sir'-fid) (also called hover flies for their ability to hover like hummingbirds over flowers) are robust, yellow-and-black or white-and-black striped flies. The adults feed on nectar, but their greenish grey larvae are voracious aphid predators.



Aphid midge larva
2-3 mm



Syrphid
8-12 mm

DRAGONFLIES Not really flies, these are large, familiar insects with spectacular flying and hunting skills. **Dragonflies** and their smaller relatives the **damselflies**, capture huge numbers of mosquitoes, midges and gnats on the wing. Dragonfly nymphs live in water, where they prey on mosquito larvae and other aquatic insects. Although some people are afraid dragonflies sting, they are entirely harmless.

TRUE BUGS There really is a group of insects, the Hemiptera, called "true bugs" to distinguish them from "bugs" in general. They have needlelike beaks for sucking

fluids, a characteristic triangular shaped section behind the head and leathery wings crossed flat over their backs. Some are plant pests—but others are vicious predators, such as the **assassin bugs** and **ambush bugs** that lurk among the leaves to catch unwary prey. **Minute pirate bugs** can probe deep inside flowers to catch thrips and **damsel bugs** and **big-eyed bugs** are notable predators of tarnished plant bugs and other pests. Predatory bugs are valuable natural enemies of aphids, leafhopper nymphs, beetle larvae, caterpillars, thrips, spider mites and moth eggs.



Assassin bug
1.5-2 cm



Minute pirate bug
3 mm

BEETLES Most people know a ladybird beetle is a super aphid predator, but did you know that there are hundreds of related species preying on aphids, spider mites, and other small pests? Some have grey or yellow wingcovers marked with black spots or blotches, while others, such as the **spider mite destroyer** are entirely black and very small. Both adults and larvae of ladybird beetles are predators. The larvae resemble tiny alligators, covered with rows of short spines.



Lady beetle
and larva
4-5 mm



Ground beetle
2-3 cm

Ground beetles are another large family of beetles, with over 2,500 species in North America. These are large iridescent

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You can control most insect pests around your home and garden without harming the environment or poisoning your living spaces. This series of common sense guides was developed to encourage safe, practical alternatives to overuse of pesticides at home. Non-toxic pest control really works!



Adopted from the
Safe and Sensible Pest Control Series,
Ministry of Environment, Lands and Parks
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Il existe une version française de ce document

black beetles we see scurrying quickly out of the light when we turn over a rock. They are a gardener's best friend because they eat slug eggs, grubs and insect pupae in the soil; some even run up trees after tent caterpillars. The slender, swift rove



*Rove beetle
3-6 mm*

beetles are another valuable group of soil-dwelling beetles. With their short wing covers they look like earwigs without pincers. They prey on root maggots, insect eggs and grubs in the soil and may kill as many as 80% of the cabbage root maggots in a field. Some species climb low growing plants at night after aphids.

LACEWINGS These delicate insects have large, finely veined wings. Both adults and larvae are predators, but it is the larvae that earn the name of "aphid lions" because they eat so many aphids.

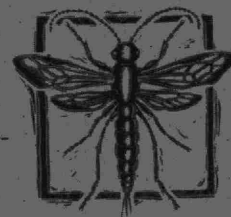


*Lacewing 1 cm
and nymph*

They also prey on spider mites, thrips, leafhoppers, small caterpillars and insect eggs. Over two dozen species of **green lacewings** occur in Canada. Their eggs, which are laid singly on long stalks, are often seen standing up along the leaf veins of garden plants. The larvae are tapering, alligator shaped, with prominent curved jaws that they use to capture their prey. The similar **brown lacewings** are smaller and more prolific.

WASPS Unfortunately, most people think of yellowjackets when they hear of wasps. **Yellowjackets** are excellent predators of house flies and caterpillars and have been seen

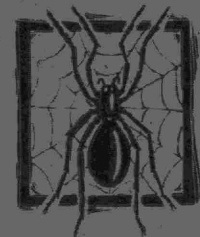
bringing over 225 flies per hour to a single nest to feed their young. It is arguable whether the benefits from yellowjackets outweigh their disadvantages, but there is no argument about the benefits from three other important groups of native parasitic wasps—and these don't sting! The **ichneumonid wasps** (ick-new-mon'id) are slim, "wasp-waisted" with long antennae and threadlike ovipositor extending from the tip of their abdomen (it looks like a stinger, but isn't).



Ichneumon 1 cm

Wasps use their ovipositor to inject eggs into spruce budworms, tent caterpillars, and other larvae. Ichneumonids vary in size from just 5 mm long to large, 3 cm long, blue-black wasps that can drill into wood to parasitize sawflies. **Bracconid wasps** (brack-on'id) are a group of smaller, more compact parasitic wasps. They lay eggs in flies, beetles, other wasps, caterpillars and aphids. Bracconids that parasitize aphids are widespread; as the young wasp develops inside, it turns the aphid into a rigid, tan or bronze coloured mummy that is easy to see on the leaf. Last, but not least, are the **chalcid wasps** (cal'id), a large group of extremely small parasites (many under 1 mm long) that parasitize aphids, flies, beetles and many caterpillars that attack forest trees and agricultural crops.

SPIDERS These are not insects, but because they are similar, are often discussed with insects. Unfortunately, **spiders** inspire fear and loathing, whereas they should garner respect for being extremely effective predators. Poisonous



*Spider
0.5-1.0 cm*

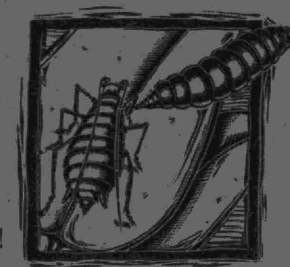
species are exceedingly rare and very timid. There are many species of spiders and the more you see in the garden, the better pest control you will have. Mites are related to spiders, but are minute in comparison (many under 0.5 mm long). Spider mites and rust mites are pests, but they have natural enemies too—native **predatory mites** abound in trees and shrubs and in the litter on the soil surface.

How to Attract and Conserve the Natural Enemies in Your Yard

- Stop using pesticides, especially broad-spectrum or residual chemicals. Most products meant to kill pests also kill beneficial insects. Foil pest attacks with physical barriers, such as cutworm collars or floating row covers. Use sprays of the biological control *Bacillus thuringiensis* (also known as BT) against caterpillars and high-pressure sprays of water to control aphids. Resort to pesticides only when effective alternatives are not available and use them only when pests are present, instead of as a preventative measure. Select pesticides such as pyrethrins, insecticidal soap and dormant oils sprays that have little or no residual effect, and confine treatments to just the plants being damaged.
- Plant pollen and nectar plants to attract beneficial insects into your yard. The adult beneficial flies, midges, and parasitic wasps must have nectar to give them the energy to lay eggs, while ladybird beetles, lacewings and pirate bugs supplement their diets with pollen when prey is scarce. Once adults are attracted to the garden, they are likely to stay and lay their eggs there. The small flowers of dill, parsley, caraway, catnip, lemon balm, thyme and other herbs provide

food for tiny parasites that can drown in the nectar of larger flowers; daisies, coneflowers and yarrow are good pollen sources. Annuals, such as alyssum, candytuft, marigolds, phacelia, schizanthus and salvias are also attractive. Consider leaving a few weeds in the borders: dandelions, goldenrod, wild carrot, lamb's quarters, nettles and wild mustard are excellent for beneficial insects.

- In areas with dry summers, provide a safe drinking water source where they won't drown. Fill a container of water with rocks, so that the rocks become islands, or make a floating island from a disk of plywood cut to a size slightly smaller than the diameter of the water container. An example of the importance of this is shown by a study that found that aphid midges lay twice as many eggs when they have a water supply.
- Get a good insect guide and learn to recognize the variety of insects you see in your yard, it could become more fascinating than birdwatching!



The best long-term control for aphids is enlisting the aid of their natural enemies